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MARKS & CLERK

(54) PROCEDE ET DISPOSITIF POUR CHAUFFER UNE BANDE DE MATIERE FIBREUSE

(54) METHOD AND DEVICE FOR HEATING A BAND OF FIBROUS MATERIAL

(57)

The invention relates to a method for heating a band of fibrous material on a drainage screen (6), whereby warm or hot water is applied on and impregnates the band (11). The invention is particularly characterized in that steam is supplied additionally into a common or directly attached closed chamber (8', 16). The invention also relates to a device for implementing said method, whereby a steam (15) or steam-air mixture inlet (14) is additionally provided inside the hood (8') arranged above the warm or hot water inlet (12, 13) or directly attached thereto.

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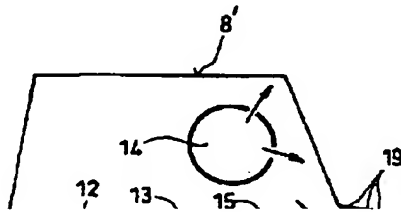
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(54) **PROCEDE ET DISPOSITIF POUR CHAUFFER UNE BANDE DE
MATIERE FIBREUSE**

(54) **METHOD AND DEVICE FOR HEATING A BAND OF FIBROUS
MATERIAL**



Summary

The invention refers to a process for heating a pulp web on a dewatering wire 6, where warm or hot water is applied to the web 11 and then sucked through it. It is mainly characterised by steam being applied in addition in the same enclosed area as the hot water or in an adjacent enclosed area 8', 16. The invention also refers to a device for implementing the process, where steam 15 or a mixture of steam and air 14 is applied in addition inside the hood 8' located above the hot or warm water supply 12, 13 or immediately after it.

Process and Device for Heating a Pulp Web

The invention relates to a process and a device for heating a pulp web on a dewatering wire, where warm or hot water is applied to the web and then
5 sucked through it.

In the pulp dewatering machines built to date the web is usually heated by applying warm or hot water. This causes a reduction in viscosity, resulting in a better pressing effect in the subsequent press. The application of hot water must stop before the end of the Fourdrinier wire so that there is still
10 sufficient time left to extract the water from the web again. As a result, air is sucked into the web beyond this point, causing the web to cool down. Thus, part of the heating effect of the water is lost again.

The disadvantage of applying steam to the web instead of water is that valuable steam energy has to be used to heat the web, although there is
15 plenty of hot water available. Furthermore, this steam is then lost and additional water has to be heated to feed the boiler. Steam blow boxes have to be built to cope with higher temperatures, making them expensive.

The aim of the invention is to create a process to heat the web efficiently and economically.

20 The invention is characterised by steam being applied in addition in the same enclosed area as the hot water or in an adjacent enclosed area. This stops air from being sucked in, as well as preventing the drop in web temperature by approximately 5 - 6°C which this causes.

A favourable further development of the invention is characterised by a
25 mixture of steam and air being applied in the enclosed area. This reduces the amount of expensive steam energy required or avoids the need therefor. The advantage of avoiding any cooling down of the web by applying steam alone is also retained when a mixture of steam and air is applied in the same manner.

30 An advantageous configuration of the invention is characterised by flash steam being used. This steam is generated by the process itself and is thus available without incurring high costs.

An advantageous further development of the invention is characterised by waste energy being used as steam or steam and air mixture, where the exhaust air from a subsequent dryer can be used as steam and air mixture. This exhaust air can be taken from the process before or after
5 the individual stages of a heat recovery system. Thus, the web can be heated very economically.

A favourable configuration of the invention is characterised by the steam or the mixture of steam and air moving at roughly the same speed as the wire and the pulp web. A kind of "air carpet" is formed as a result, thus
10 ensuring that the web is heated evenly, while also sealing it off to prevent additional air being sucked in.

A favourable further development of the invention is characterised by the mixture of steam and air having a dew point which is approximately equivalent to the web temperature, where the dew point lies between 80°C and 95°C, preferably 85°C. As a result, the web temperature is kept at a
15 constant level and only a small amount of steam or flash steam is required.

A favourable configuration of the invention is characterised by the steam being injected and the steam input acting as a jet pump for the surrounding air. This creates a corresponding progressive motion by the
20 mixture of steam and air and covers the web until it reaches the end of the hood.

An advantageous further development of the invention is characterised by the amount of steam being regulated according to the temperature of the air extracted. As a result, the optimum steam quantity can be injected at
25 all times, which provides a highly economical operating method.

An advantageous configuration of the invention is characterised by different amounts of steam being applied at different points over the machine width. This is a particularly favourable method of effecting any
30 necessary correction of the cross-machine profile.

The invention also refers to a device for heating a pulp web on a dewatering wire, where warm or hot water is applied to the web through a gutter, a pipe, or through perforated plates or other distribution devices,

where this device is characterised by steam or a mixture of steam and air being applied in addition inside the hood located above the hot or warm water supply or immediately after it.

5 An advantageous further development of the invention is characterised by the hood having a smaller cross-section in the area where the steam is added.

A favourable configuration of the invention is characterised by the steam input being designed as an injector.

10 A favourable further development of the invention is characterised by an extraction device being provided at the end of the hood.

An advantageous configuration of the invention is characterised by several steam input pipes being provided in cross-machine direction.

15 An advantageous further development of the invention is characterised by the steam input valves being located close to the steam outlet, however the steam input valves can also be located outside the machine as an alternative.

20 The invention will now be described in examples and referring to the drawings, where Fig. 1 shows a state-of-the-art plant, Fig. 2 contains a diagrammatic view of the invention, Fig. 3 shows a diagrammatic view according to Fig. 2 with a regulating device, and Figs. 4a and 4b show further possible variants of the invention.

25 Figure 1 shows the Fourdrinier wire 1 of a pulp dewatering machine with a subsequent press section 2, heavy-duty press 3 and drier 4. The pulp suspension is fed onto the wire 6 through a headbox 5. The water is extracted by suction pipes 7. Warm water gutters are installed in a hood 8, where the warm water flows through openings 9, 9' onto the web. After leaving the hood 8 area, water is extracted again from the web by suction pipes 7, 10. Air is also sucked in at this point, which reduces the web temperature by some 5 - 6°C before it enters the press section 2.

30 Figure 2 now shows a diagrammatic view of the invention. Above the wire 6 and the pulp web 11 which has already formed is a hood 8', with the present illustration showing a single hood only. Hot water, for example, is

applied to the pulp web 11 through a gutter 12 or a pipe 13. In the upper section of the hood 8', air is blown in through a pipe 14, and this air can be taken from exhaust air coming from the dryer. Thus, the energy the exhaust air contains can be put to use. Steam is blown in through another pipe 15. Since this pipe is designed like a jet pump, the mixture of steam and air at a dew point of, for example, approximately 85°C is sucked from the enclosed area 16 through the pulp web 11 and the wire 6, as shown by the arrows 17. As the steam input 15 acts as a jet pump, a flow 19 of the mixture of steam and air is generated in the web running direction 20.

- 10 Figure 3 shows another view of the invention analogous to that in Fig. 2. In addition, the present illustration shows the suction pipes 7, a temperature measuring probe 21, a temperature controller 22, and a steam control valve 23. This regulating system ensures that the optimum amount of steam is applied at all times, thus always achieving the most
15 favourable use of the energy available.

Figure 4a shows a variant whereby the steam control valves 23 are located outside the width of the pulp web 11. Thus, the valves can be of very simple and low-cost design and also be easy to maintain. As an alternative, the valves 23 can also be mounted within the width of the pulp
20 web 11, as shown in Fig. 4b. This variant has the advantage of short regulating periods, which allows the plant to react very quickly to variations in the cross-machine profile.

The valves, particularly for regulating the cross-machine profile, can be controlled by the process control system, which can also use the
25 temperature of the air extracted as a regulating variable.

Tests have shown that the invention can heat the pulp web to approximately 75°C, compared with the current heating performance from approximately 60°C to 65°C. This is achieved on the one hand by the additional use of steam or a mixture of steam and air, and on the other
30 hand by sealing the web off more effectively against the surrounding area so that virtually no cool air is sucked through the web, which would cause it to cool down.

The invention is not limited to the designs shown in the enclosed drawings. It would also be feasible to use it in paper or board machines, for example. Furthermore, an additional hood with an enclosed area 16 where the additional air 14 or steam 15 is added can be mounted
5 adjoining an existing hood 8.

Patent Claims

1. Process for heating a pulp web on a dewatering wire, where warm or hot water is applied to the web and then sucked through it, characterised by steam being applied in addition in the same enclosed area as the hot water or in an adjacent enclosed area.
2. Process according to Claim 1, characterised by a mixture of steam and air being applied in the enclosed area.
3. Process according to Claim 1 or 2, characterised by flash steam being used.
4. Process according to one of Claims 1 to 3, characterised by waste energy being used as steam or steam and air mixture.
5. Process according to Claim 4, characterised by the exhaust air from a subsequent dryer being used as steam and air mixture.
6. Process according to one of Claims 1 to 5, characterised by the steam or the mixture of steam and air moving at roughly the same speed as the wire and the pulp web.
7. Process according to one of Claims 2 to 6, characterised by the mixture of steam and air having a dew point which is approximately equivalent to the web temperature.
8. Process according to Claim 7, characterised by the dew point lying between 80 and 95°C, preferably 85°C.
9. Process according to one of Claims 1 to 8, characterised by the steam being injected and the steam input acting as a jet pump for the surrounding air.
10. Process according to one of Claims 1 to 9, characterised by the amount of steam being regulated according to the temperature of the air extracted.

11. Process according to one of Claims 1 to 10, characterised by different amounts of steam being applied at different points over the machine width.
- 5 12. Device for heating a pulp web on a dewatering wire, where warm or hot water is applied to the web through a gutter, a pipe, or through perforated plates or other distribution devices, where this device is characterised by steam or a mixture of steam and air being applied in addition inside the hood located above the hot or warm water supply or immediately after it.
- 10 13. Device according to Claim 12, characterised by the hood having a smaller cross-section in the area where the steam is added.
14. Device according to Claim 12 or 13, characterised by the steam input being designed as an injector.
- 15 15. Device according to one of Claims 12 to 14, characterised by an extraction device being provided at the end of the hood.
16. Device according to one of Claims 12 to 15, characterised by several steam input pipes being provided in cross-machine direction.
17. Device according to Claim 16, characterised by the steam input valves being located close to the steam outlet.
- 20 18. Device according to Claim 16, characterised by the steam input valves being located outside the machine.

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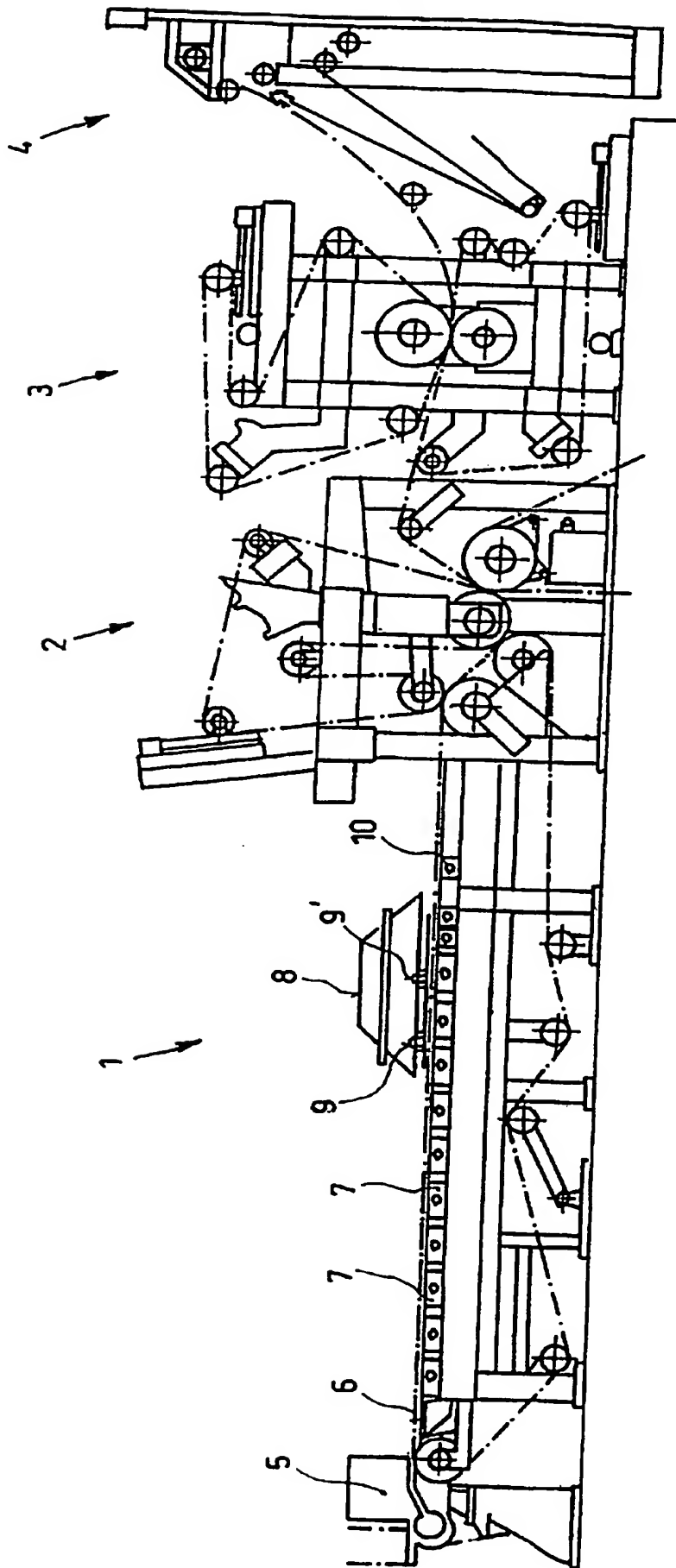
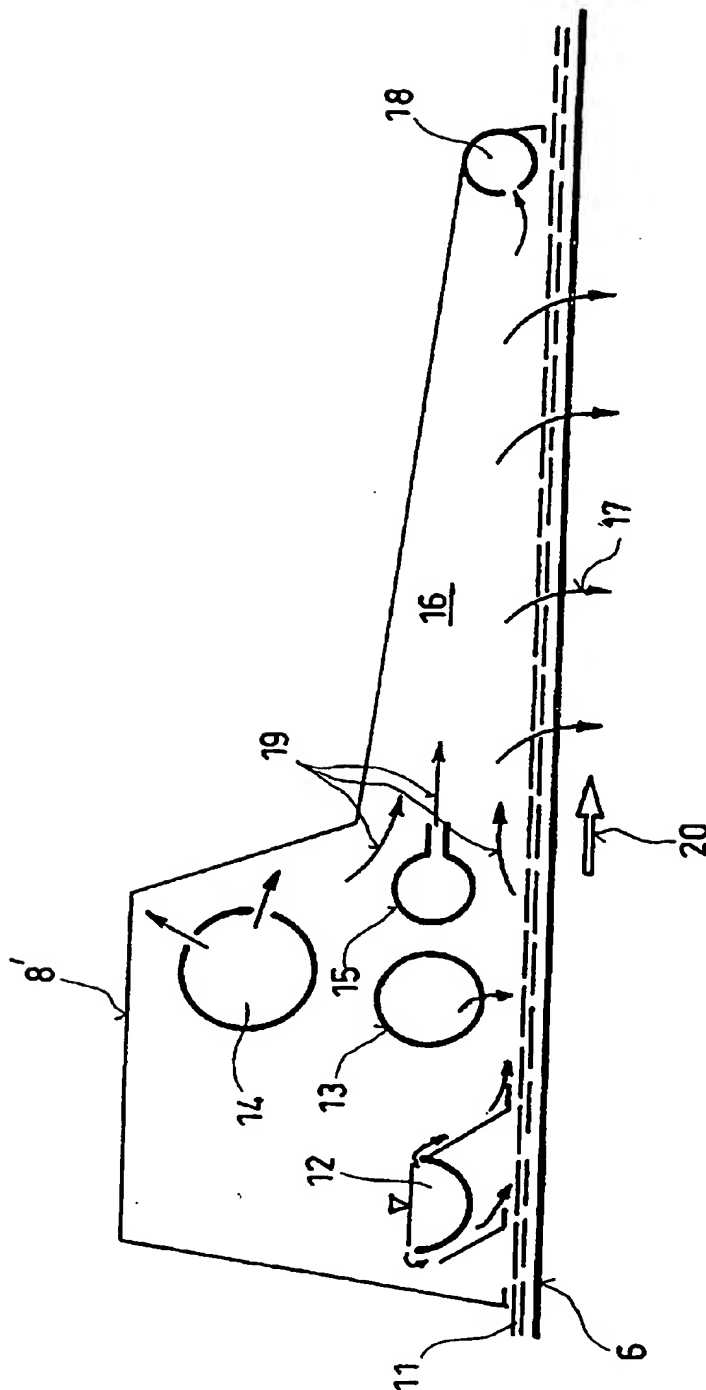


Fig. 1

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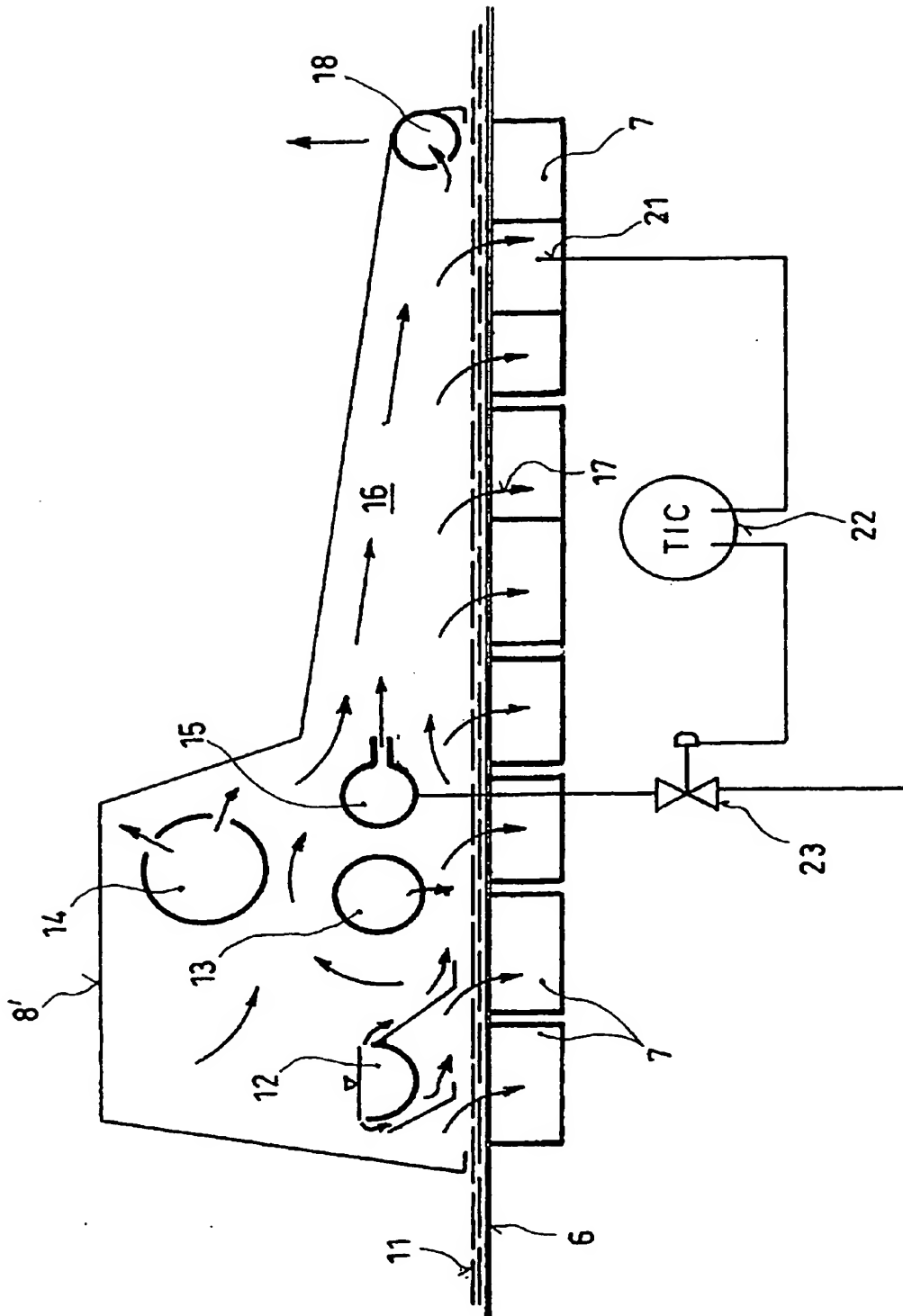


Fig. 3

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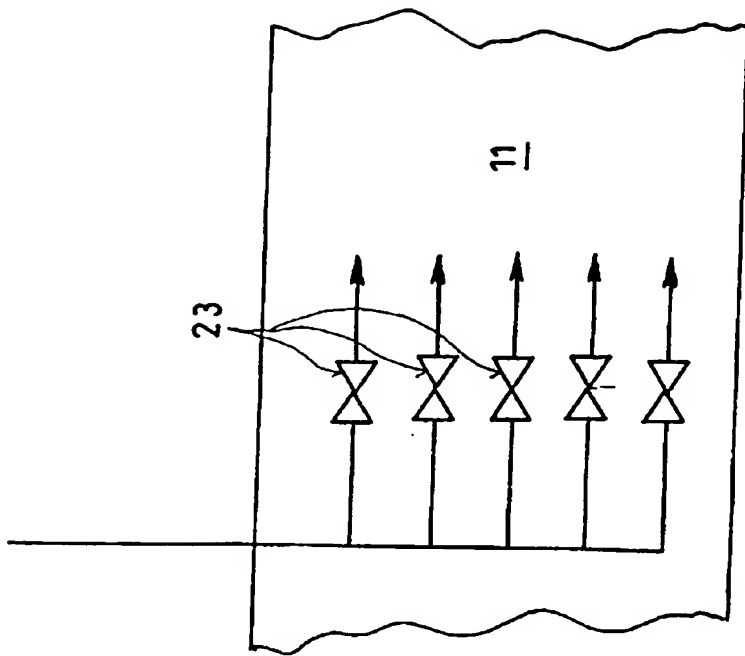
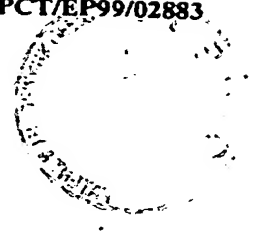


Fig. 4b

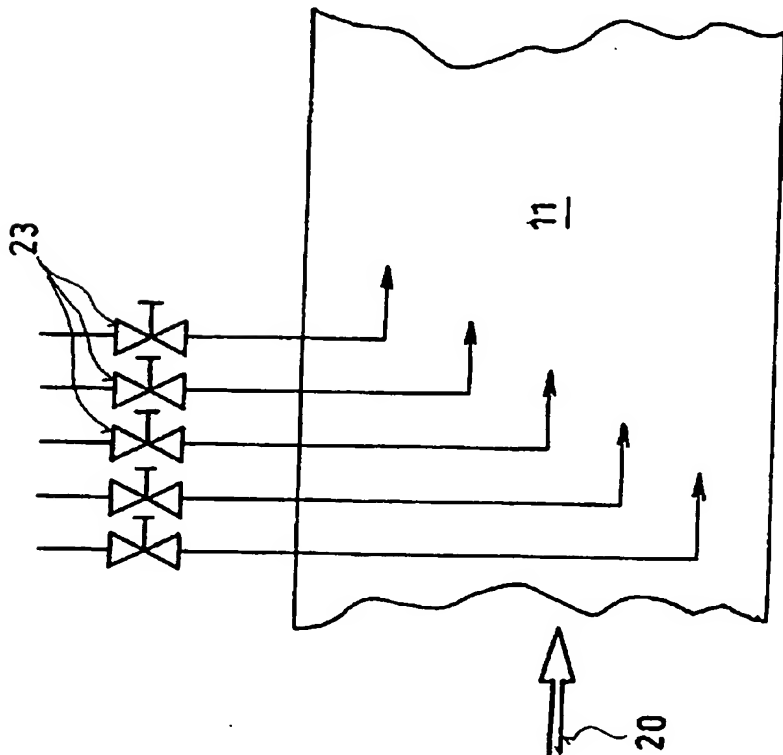


Fig. 4a

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